UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,383	11/13/2006	Sture Lindahl	43315-229589	9435

26694 7590 04/08/2009

VENABLE LLP
P.O. BOX 34385
WASHINGTON, DC 20043-9998

EXAMINER	
PHAM, EMILY P	

ART UNIT	PAPER NUMBER
2838	

MAIL DATE	DELIVERY MODE
04/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,383	LINDAHL ET AL.	
	Examiner	Art Unit	
	EMILY PHAM	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42-93* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The final rejection of last office action is withdrawn.

2. Applicant's arguments filed 3/23/2009 have been fully considered but they are not persuasive.

Arguments presented on pages 3-16 of Applicant's arguments to discuss prior arts used to reject claims 42-93, are mainly based on *two shunt-connected transformers* which are not claimed.

The claim limitation " at least one transformer" in claims 42, 69, and 92 is understood as one transformer at one end of the transmission line is arranged in shunt connection to the transmission line, operatively controlled by a voltage control member, and has tap-changer. In addition, the Abstract of Iyoda et al addresses a tap-changing transformer; FIG 4B and FIG 4B of Koeppe et al shows two transformers 22a and 22b, one of them arranged in shunt-connection at first end of the AC transmission line, the other arranged in shunt-connection at second end of the AC transmission line, and D-SMES 30 has voltage regulator and control 60 to control the transformer 22a.

3. The following office action is responsive to the amended claims filed on 9/04/2008.

Claim Objections

4. Claim 42 is objected to because of the following informalities: "minimize" (line 9 of claim 1) should be "minimized". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. Claims 42- 93 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 42 recites the limitation "said transformers" in lines 7 and 11, “the transformer” in line 11. There is insufficient antecedent basis for this limitation in the claim because it is unclear what transformer is referred to. It is encouraged to consistently use same term to refer to same element.

Claim 42 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: another transformer because if each end of the AC transmission line has one transformer (as claimed “at least one transformer”) then the coordinated manner of operation can not be performed. The claim language is confusing because it does not point out clearly what transformers are controlled in the coordinated manner: transformers at each end of the transmission line or transformers at one end of transmission line.

Claim 69 recites the limitation "said transformers" in line 6. There is insufficient antecedent basis for this limitation in the claim because it is unclear what transformer is referred to.

Claim 83 recites the limitation "said transformers" in lines 4, 6, 7, and 11. There is insufficient antecedent basis for this limitation in the claim because no transformer is claimed previously.

Claim 92 recites the limitation "said transformers" in line 6. There is insufficient antecedent basis for this limitation in the claim because it is unclear what transformer is referred to.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 42, 69, 83, and 92 are rejected under 35 U.S.C. 102(b) as being anticipated by Nelson et al (USP 5,610,501)

Regarding claim 42: Nelson et al **(FIG 1; Description of the Preferred Embodiment)** discloses a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising:
at least one AC transmission cable;
at least one transformer **(21, 13)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable **(3)**;
a voltage control member **(9)** operatively connected to the at least one said transformer **(21, 13)** and operative to control said transformers **(21, 13)** in a coordinated manner to

regulate an operating voltage of said AC transmission cable **(3)** operate the transformer **(21, 13)** at a voltage whereby losses due to reactive power transport are minimize; and at least one tap-changer **(transformer with improved tap-changer; col. 1, lines 20-36)** operatively connected to the voltage control member **(9)** and to one of said transformers **(21, 13)** to vary the voltage transformation of the transformer **(21, 13)** according to said operating voltage.

Regarding claim 69: Nelson et al **(FIG 1; Description of the Preferred Embodiment)** discloses the apparatus at its normal operation performing the steps of method recited in claim 69.

Regarding claim 83: Nelson et al **(FIG 1; Description of the Preferred Embodiment)** discloses a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks the system comprising: at least one said transformer **(21, 13)** with variable voltage transformation arranged in shunt connection at each end of the AC transmission cable **(3)**; and a voltage control member **(9)** operatively connected to said transformers **(21, 13)** and operative to control said transformers **(21, 13)** in a coordinated manner to regulate an operating voltage of said AC transmission cable operate the at least one transformer **(21, 13)** at a voltage dependent on the surge impedance of the cable whereby losses due to reactive power transport are minimized; and at least one tap-changer **(transformer with improved tap-changer; col. 1, lines 20-36)** operatively connected to the voltage control member **(9)** and to one of said transformers **(21, 13)** to vary a

voltage transformation of the voltage transformer **(21, 13)** according to said operating voltage.

Regarding claim 92: Nelson et al **(FIG 1; Description of the Preferred Embodiment)** discloses the apparatus at its normal operation performing the steps of method recited in claim 92.

8. Claims 42, 69, 83, and 93 are rejected under 35 U.S.C. 102(b) as being anticipated by Kappenman (USP 5,461,300).

Regarding claim 42: Kappenman **(FIG 1; Detailed Description of the Preferred Embodiments)** discloses a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising:

at least one AC transmission cable;

at least one transformer **(33a, 34a; col. 2, lines 43-48)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable;

a voltage control member **(50)** operatively connected to the at least one said transformer and operative to control said transformers **(33a, 34a; col. 2, lines 43-48)** in a coordinated manner to regulate an operating voltage of said AC transmission cable operate the transformer **(33a, 34a; col. 2, lines 43-48)** at a voltage whereby losses due to reactive power transport are minimize; and

at least one tap-changer **(col. 3, lines 3-14)** operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer **(33a, 34a; col. 2, lines 43-48)** according to said operating voltage.

Regarding claim 69: Kappenman **(FIG 1; Detailed Description of the Preferred Embodiments)** discloses the apparatus at its normal operation performing the steps of method recited in claim 69.

Regarding claim 83: Kappenman **(FIG 1; Detailed Description of the Preferred Embodiments)** discloses a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks the system comprising:

at least one said transformer **(33a, 34a; col. 2, lines 43-48)** with variable voltage transformation arranged in shunt connection at each end of the AC transmission cable; and

a voltage control member **(50)** operatively connected to said transformers **(33a, 34a; col. 2, lines 43-48)** and operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable operate the at least one transformer **(33a, 34a; col. 2, lines 43-48)** at a voltage dependent on the surge impedance of the cable whereby losses due to reactive power transport are minimized; and

at least one tap-changer **(col. 3, lines 3-14)** operatively connected to the voltage control member and to one of said transformers **(33a, 34a; col. 2, lines 43-48)** to vary a voltage transformation of the voltage transformer **(33a, 34a; col. 2, lines 43-48)** according to said operating voltage.

Regarding claim 92: Kappenman **(FIG 1; Detailed Description of the Preferred Embodiments)** discloses the apparatus at its normal operation performing the steps of method recited in claim 92.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Iyoda et al. (USP 6,680,602).

Koeppe et al. **(FIG 4, FIG 4B)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(20)**; at least one transformer **(22a, 22b)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable **(20);** a voltage control member **(60)** operatively connected to the at least one said transformer **(22a, 22b)** to minimize losses due to reactive power transport **(col. 3, lines 46-49)**.

Koeppe et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage

control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Iyoda et al. **(FIG 1, FIG 4)** teach a voltage control member **(1, 10)** operative to control said transformers **(Transformer 17)** in a coordinated manner to regulate an operating voltage of said AC transmission cable; at least one tap-changer **(tap changer 17a)** operatively connected to the voltage control member **(1, 10)** and to one of said transformers **(Transformer 17)** to vary the voltage transformation of the transformer **(Transformer 17)** according to said operating voltage. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. with the reactor power compensator taught by Iyoda et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage **(Iyoda et al., col. 5, lines 16-43)**.

11. Claims 42-46, 48, 50, 58, 66-74, 77-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565).

Regarding claims 42-46, 50, 58, 66-68: Koeppe et al. **(FIG 4, FIG 4B)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(20)**; at least one transformer **(22a, 22b)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC

transmission cable **(20);** a voltage control member **(60)** operatively connected to the at least one said transformer **(22a, 22b)** to minimize losses due to reactive power transport **(col. 3, lines 46-49)**.

Koeppe et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Wilkins et al. **(FIG 4)** teach a voltage control member **(line drop compensator 445)** operative to control said transformers **(402)** in a coordinated manner to regulate an operating voltage of said AC transmission cable; at least one tap-changer **(402)** operatively connected to the voltage control member **(445)** and to one of said transformers **(402)** to vary the voltage transformation of the transformer **(402)** according to said operating voltage. **(The line drop compensator and tap changer of Wilkins et al. can be duplicated to be operatively connected to the transformers connected to two ends of the transmission line.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. with the real and reactive power control for wind turbine generator systems taught by Wilkins et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage **(Wilkins et al., col. 5, lines 16-19)**.

Regarding claims 69-74, 77-80: Koeppe et al. in view of Wilkins et al. **(see rejection of claims 42-46, 50, 58, 66-68 above)** disclose the apparatus at its normal operation performing the steps of method disclosed in claims 69-74 and 77-80.

12. Claims 83-87, and 90-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738).

Regarding claims 83-87, 90, 91: Koeppe et al. **(FIG 4, FIG 4B)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(20)**; at least one transformer **(22a, 22b)** with variable voltage transformation arranged in shunt connection at each end of the at least one AC transmission cable **(20);** a voltage control member **(60)** operatively connected to the at least one said transformer **(22a, 22b)** to minimize losses due to reactive power transport **(col. 3, lines 46-49)**.

However Koeppe et al. do not disclose a voltage control member operative to control said transformers in a coordinated manner to regulate an operating voltage of said AC transmission cable; and at least one tap-changer operatively connected to the voltage control member and to one of said transformers to vary the voltage transformation of the transformer according to said operating voltage.

Vithayathil et al. **(FIG 1, FIG 1(a))** teach a voltage control member **(10)** operative to control said transformers **(12)** in a coordinated manner to regulate an operating

voltage of said AC transmission cable; at least one tap-changer **(402)** operatively connected to the voltage control member **(445)** and to one of said transformers **(402)** to vary the voltage transformation of the transformer **(402)** according to said operating voltage. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. with the device for rapid adjustment of network impedance taught by Vithayathil et al. for the purpose of regulating the voltage transformation of the transformer according to operating voltage by adjusting the transfer impedance **(Vithayathil et al., Abstract)**.

Regarding claims 92-93: Koeppe et al. in view of Vithayathil et al. **(see rejection of claims 83-87, 90, 91 above)** disclose the apparatus at its normal operation performing the steps of method disclosed in claims 92-93.

13. Dependent claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565) and further in view of Ghosh et al. (USP 6,925,385).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for a graphical user interface for controlling the AC transmission, the interface comprising: at least one object oriented application for presenting data, parameter values and control actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer. Ghosh et al. teach a graphical user interface for controlling the AC transmission (**GUI to control and manage the wind power system)**

the interface comprising: at least one object oriented application for presenting data, parameter values and control actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer **(FIG 2 – FIG 10; col. 11, lines 20-30)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. in view of Wilkins et al. with the GUI system taught by Ghosh et al. for the purpose of control and manage the AC power transmission system through data and parameters communication.

14. Dependent claims 47, 75, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Hubert et al. (USP 6,577,108).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time. Hubert et al. teach the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time **(FIG 4, FIG 5; col. 5, lines 29-45)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. in view of Wilkins et al. with the voltage regulation circuit taught by Hubert et al. to monitor the temperature of the AC transmission cable.

15. Dependent claims 49 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Palmer (USP 4,081,741).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for a tap-changer /one or more tap changer by-pass connectors. Palmer (USP 4,081,741) teaches a tap-changer /one or more tap changer by-pass connectors **(FIG 4, col. 3, lines 10-31)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et al. in view of Wilkins et al. with the tap changer by-pass connectors taught by Palmer to increase the effectiveness in controlling the reactance of the AC transmission line.

16. Dependent claims 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Larsen et al. (USP 5,166,579).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for mechanical tap-changer/phase-shifting tap changer. Larsen et al. teach mechanical tap-changer/phase-shifting tap changer **(Abstract)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et al. in view of Wilkins et al. with the mechanical tap-changer/phase-shifting tap changer taught by

Larsen et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

17. Dependent claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Andrei (USP 6,011,389).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for an autotransformer. Andrei teaches an autotransformer **(Abstract; col. 2, line 50 – col. 3, line 13)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et al. in view of Wilkins et al. with the autotransformer taught by Andrei to increase the effectiveness in controlling the reactance of the AC transmission line.

18. Dependent claims 55 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Sasse et al. (US Pub 2004/0012472).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except that transformer is arranged to limit short-circuit currents. Sasse et al. teaches transformer is arranged to limit short-circuit currents **(par [0033])**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et al. in view of

Wilkins et al. with the arrangement taught by Sasse et al. to limit short-circuit currents of the AC transmission line.

19. Dependent claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Retotar (USP 4,591,963).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for a high frequency filter. Retotar teaches a high frequency filter **(FIG 1, 102; col. 2, lines 20-25)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et al. in view of Wilkins et al. with the a high frequency filter taught by Retotar to eliminate the harmonic currents of AC transmission line.

20. Dependent claims 59 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Buckett et al. (USP 4,075,679).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for one or more breakers arranged for rapid disconnect and reconnect. Buckett et al. teach breakers arranged for rapid disconnect and reconnect **(FIG 4, 17)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Koeppe et

al. in view of Wilkins et al. with the breakers taught by Buckett et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

21. Dependent claims 64, 65, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565), and further in view of Watson et al. ("Surge Potentials on Underground Cable Sheath and Joint Insulation"; IEEE Transactions on Power Apparatus and Systems; June 1963; Volume 82; Issue 66; pages 239-249).

Koeppe et al. in view of Wilkins et al. disclose claimed invention except for a cable system shield comprising transposings and sheath sectionalizing insulators reducing shield induced currents. Watson et al. teach a cable system shield comprising transposings and sheath sectionalizing insulators **(col. 1, page 239)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cable of the AC power transmission system disclosed by Koeppe et al. in view of Wilkins et al. with the transposings and sheath sectionalizing insulators taught by Watson et al. to protect the line from overvoltage and reduce shield induced currents.

22. Dependent claims 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Wilkins et al. (USP 6,924,565).

Koeppe et al. in view of Wilkins et al. disclose the claimed invention except that one AC transmission cable comprise an oil and paper insulated cable/XLPE insulated

cable/ voltage protection devices. However oil and paper insulated cable/XLPE insulated cable/ voltage protection devices are well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use oil and paper insulated cable because it is secured from moisture and dielectric loss; XLPE insulated cable because this cable with a temperature sensing optic fiber placed longitudinally along the cable could be placed in the critical circuit such as duct or overhead transmission line having unknown thermal conditions; voltage protection devices because they protect the AC transmission system from over voltage condition.

23. Dependent claim 88 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738), and further in view of Hubert et al. (USP 6,577,108). Koeppe et al. in view of Vithayathil et al. disclose claimed invention except for the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time. Hubert et al. teach the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time **(FIG 4, FIG 5; col. 5, lines 29-45)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Koeppe et al. in view of Vithayathil et al. with the voltage regulation circuit taught by Hubert et al. to monitor the temperature of the AC transmission cable.

24. Dependent claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koeppe et al. (USP 6,906,434) in view of Vithayathil et al. (USP 5,032,738), and further in view of Watson et al. ("Surge Potentials on Underground Cable Sheath and Joint Insulation"; IEEE Transactions on Power Apparatus and Systems; June 1963; Volume 82; Issue 66; pages 239-249). Koeppe et al. in view of Vithayathil et al. disclose claimed invention except for a cable system shield comprising transposings and sheath sectionalizing insulators reducing shield induced currents. Watson et al. teach a cable system shield comprising transposings and sheath sectionalizing insulators **(col. 1, page 239)**. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cable of the AC power transmission system disclosed by Koeppe et al. in view of Vithayathil et al. with the transposings and sheath sectionalizing insulators taught by Watson et al. to protect the line from overvoltage and reduce shield induced currents.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to 3 whose telephone number is (571)270-3046. The examiner can normally be reached on Mon-Thu (7:00AM - 6:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272 - 2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessica Han/
Primary Examiner, Art Unit 2838

/E P/